

# Michael A. Stone Director

JFHQ-MT, ATTN: STARBASE 1956 Mt. Majo Street, P.O. Box 4789 Fort Harrison, MT 59636-4789 Phone: (406) 324-3727 Fax (406) 324-3735





### STARBASE ACADEMY OUTLINE

#### I. Background

A unique educational program came to life in 1990 at Selfridge Air National Guard Base, Michigan: STARBASE

STARBASE is a program that combats some of the most challenging problems facing America's youth, such as negative feelings toward science and math, lack of personal direction, and substance abuse. Set at a military installation, STARBASE affords classrooms of children an educational opportunity unlike anything they have ever experienced before. Through five days of exciting, hands-on, minds-on curriculum and exposure to positive, caring mentors and role models, STARBASE sparks children with an enthusiasm to learn, strengthens their confidence in their abilities, and motivates them to lead successful, self-satisfying, healthy lives. STARBASE is committed to taking an active role in preparing our children to meet the challenges they face today and the challenges they are certain to face tomorrow.

A military facility provides the perfect setting for STARBASE. Its resources offer an exciting platform upon which the program builds its inspiring curriculum and its positive role models reinforce the importance of education, teamwork, goal setting, and self-discipline. STARBASE takes many opportunities to assure the children visit the varied work places on the installations and interact with the personnel who maintain the operations. It is not uncommon for STARBASE participants to see, first-hand, the workings of an avionics lab, an aircraft maintenance hangar, sit in a flight simulator and to have up-close looks at some of the worlds most advanced aircraft such as the F15, C-12R, Chinook Helicopter, Kiowa Helicopter, and the Blackhawk helicopter. It is these unique resources and positive military role models that foster renewed perceptions for math, science, and technology with the children. No longer are math, science, and technology concepts merely abstractions; they are concrete concepts that have practical applications to real life needs.

Since its inception 15+ years ago, STARBASE has found itself bestowed with extraordinary success – a banner it carries with pride, for it is the program's success that substantiates its mission and attests to its worth in adding value to the lives of America's youth. A program that simply began as a one-week experience for a select, few children has blossomed into something remarkable.

The dream of STARBASE was to create a program that would respond to the needs of today's youth by providing alternative, stimulating, hands-on math, science, technology, and motivational goal setting/self-esteem activities. A military installation, with its obvious stimulating and exclusive high-tech resources, seemed like the perfect setting for such a concept. With more than a year of collaboration and preparation between community and military leaders, the summer of 1990 saw this dream become a reality. STARBASE offered its first five-day academy at Selfridge Air National Guard Base, Michigan. The academy was a success but, despite this, the initial seed money never intended to carry the program beyond this trial week. The program had to secure additional funds from other sources for its sustenance. These funds came in the spring of 1991. The W. K. Kellogg foundation awarded a grant to the program, and STARBASE was able to open its doors year-round.

In the fall of 1992, before completing its first full year of operation, STARBASE received even more support when Washington legislators signed into law, and appropriated dollars, language that allowed STARBASE to exist as a pilot program under the Department of Defense. This was a momentous occasion, launching the program into its expansion. Never was it imagined the program would be embraced so enthusiastically and so quickly. This rapid growth truly affirmed that the children of America have a need and that STARBASE is rising to meet their need.

The year 2000 marked another milestone for STARBASE. At this time, STARBASE transitioned from a pilot program to an official program of the Department of Defense. Today, under the direction of the National Guard, Navy, Air Force, Air Force Reserves, and Marines, STARBASE has programs in over 34 states and U. S. territories with many states having two or more sites.

STARBASE is working without reserve to reach out to and enrich the lives of more children each day. It is making great strides in achieving its goal to provide two sites per state and U.S. territories. With the unrelenting passion and commitment from military and community leaders, STARBASE can continue to enjoy its growth and have pride in knowing it will positively influence the lives of thousands of children – America's future – for years to come. Many of

America's children may be educationally at-risk but they do not have to be. STARBASE is ensuring that no child is at-risk one child at a time.

#### II. Mission

By exposing youth to the technological environments and positive role models found on military bases, installations, and within local districts, we will provide 20-25 hours of an exemplary instruction, using a common core curriculum that meet or exceed the National Standards. We will nurture a winning network of collaborators and build mutual loyalty.

#### III. Objectives

- A. Demonstrate the relevancy and use of science, technology, engineering and math in the real world.
- B. Stimulate student and teacher interest in science, technology, engineering and math through up-to-date "hands-on, minds-on" curriculum.
- C. Increase the desire of youth to continue their education by directly relating science, technology, engineering and math to exciting career opportunities.
- D. Develop student teamwork skills by providing real world, problem-solving activities that demonstrate the importance and advantage of working collaboratively with others to solve problems.
- E. Stress the importance of maintaining a healthy, drug-free lifestyle.
- F. Illustrate personal goal setting skills and encourage students to identify actions they can initiate to achieve their goals.
- G. Assist teachers in expanding their students' STARBASE experience by providing them with opportunities and resources that will further stimulate their students' interests in science, technology, engineering and math.
- H. Expose students to positive role models.
- I. Develop and maintain partnerships between the military, industry, business and educational communities.

#### IV. Curriculum

- A. The Academy's curriculum will include, Physics, Chemistry Sciences, Technology, Engineering, Mathematics Operations & Applications, and Science, Technology, Engineering, Math (STEM) Careers and will referred to as the Core Curriculum. Teamwork and Goal setting will be methodologies which may be embedded into daily lessons.
  - 1. Physics: (Newton's Three Laws of Motions/Fluid Mechanics and Aerodynamics)
    At minimum, the student will be able to:
    - a. Know that Sir Isaac Newton described the laws of motion and that he did this in the 1600s.
    - b. Give/identify examples of the three laws of motion.
    - c. Understand the meaning and cite examples of inertia.
    - d. Determine the faster fluids move, the less pressure they exert.
    - e. Describe Bernoulli's Principle and how/why it affects an aircraft's wing.
    - f. Understand how model rocketry relates to each of Newton's Laws of Motion.
    - g. Identify the four forces of flight

### 2. Chemistry Sciences: (Building Blocks of Matter/Physical & Chemical Changes/Atmospheric Properties)

At minimum, the student will be able to

- a. Identify and describe the four states of matter, giving/citing examples of each.
- b. Understand that faster moving molecules take up more space and spread further apart than slower moving molecules.
- c. Conclude there are more than 100 known elements that combine in a multitude of ways to produce compounds, which account for all living and non-living substances.
- d. Demonstrate that atoms combine to form molecules and molecules formed from different atoms combine to form compounds.
- e. Differentiate between a physical change in which matter changes state or form and a chemical change in which one or more new substances are formed.
- f. Conclude a change in the state of matter of a substance is the result of a change in kinetic energy.
- g. Conclude that energy in a system is conserved and may change from one form to another.

- h. Determine there are a number of characteristic properties of air including mass, weight, density, volume, and pressure.
- i. Categorize air as a fluid, similar to the ocean, based on observable properties.
- j. Understand air takes up space, applies pressure, and has weight.

#### 3. Technology: (Innovations/Navigation & Mapping)

At minimum, the student will be able to

- a. Utilize STEM software for use and real-world application of computer-aided models in design technology.
- b. Recognize the benefits of advancements in technology tools which provide information relating to location and distance.
- c. Coordinate points of latitude and longitude to specify locations and navigate from one point to another.
- d. Identify and define authentic problems and significant questions for investigation.
- e. Plan and manage activities to develop a solution or complete a project.
- f. Collect and analyze data to identify solutions and/or make informed decisions.
- g. Utilize technological tolls to gather, evaluate, and use information.

## 4. Engineering: (Engineering Design Process (EDP)/3-D Computer-Aided Design (CAD) At minimum, the student will be able to

- a. Construct a 3-D scale model based on geometric relationships using engineering design software and computer technology as required by OASD/RA.
- b. Recognize the engineering design process is a method of problem solving used to create a system, a product, or a process that meets an identified need.
- c. Relate geometric relationships and mathematical applications to parameters of CAD.
- d. Use engineering design software to demonstrate basic CAD operation and skills in the areas of:
  - Sketching (2-D geometry creation and modification)
  - Geometric & Dimensional constraints (applying appropriate constraints)
  - Modeling (3-D modeling skills and modification)
  - Assemblies (understanding and creating simple assemblies)

#### 5. Mathematics Operations & Applications: (Number & Number Relationships/ Measurement/Geometry/Data Analysis)

At minimum, the student will be able to

- a. Solve problems using fractions, decimals, and percents.
- b. Select and apply appropriate standard units and tools to measure length, area, volume, mass and degree of angle.
- c. Recognize geometric properties and relationships and apply them to other disciplines and to problems that arise in the classroom or in everyday life.
- d. Collect data using observations and experiments.
- e. Represent data using tables and graphs.

#### 6. STEM Careers

At minimum, the student will be able to

- a. Develop an awareness that scientists, technicians, engineers, and mathematicians work everywhere.
- b. Correlate their academic endeavors in STEM areas to real-world applications in career fields.

#### 7. Goal Setting

At minimum, the student will be able to

- a. Understand the value of goal setting.
- b. Identify and describe personal goals.
- c. Understand one can only achieve a goal by taking positive actions toward the goal.

#### 8. Teamwork

At minimum, the student will be able to

- a. Define teamwork.
- b. Understand the role of teamwork in problem solving.
- c. Understand the need for teams in real-world situations.
- d. Expand their communication skills.

- e. Understand basic team dynamics.
- B. The curriculum will be as flexible as possible to allow each student to work toward his/her goals.
- C. Hands-on, minds-on activities will provide motivation and will foster a participatory learning process.
- D. Teamwork activities will encourage a comfortable social interaction among the students while they learn how to work effectively with one another.
- E. The Academy's curriculum and materials will place emphasis on, among other things, experimenting, constructing, observing, measuring, graphing, interpreting data, inferring, predicting, hypothesizing, questioning, communicating, and formulating models.